



NEBRASKA STATE
CLIMATE OFFICE

Nebraska Climate Update

CARC Meeting
4 June, 2019

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Topics

Recent climate history.

The flood.

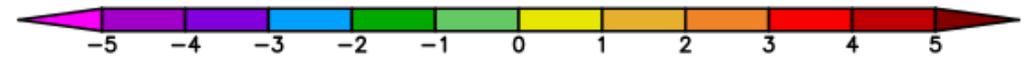
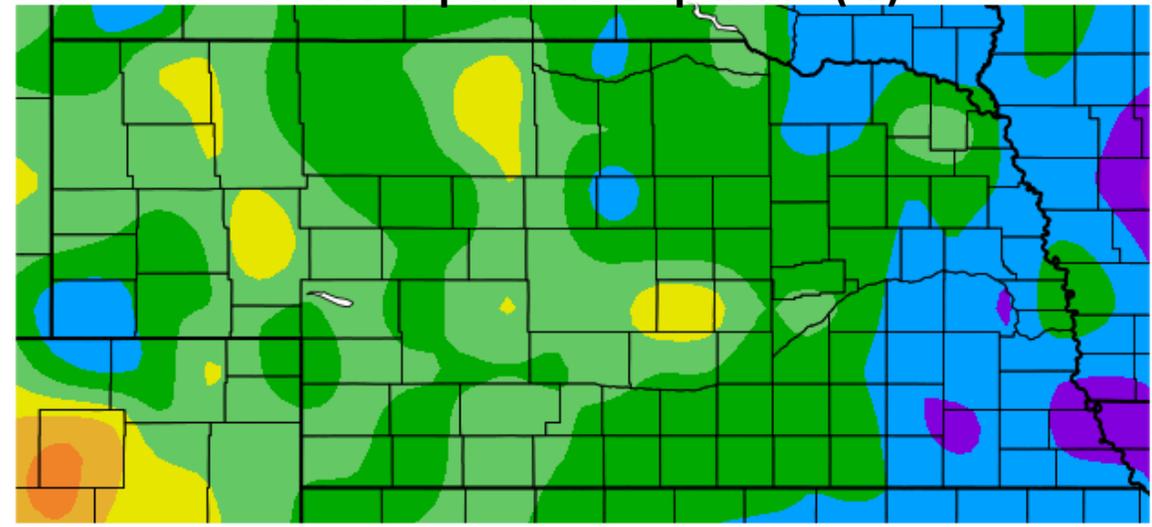
Where we are now.

Climate outlook.

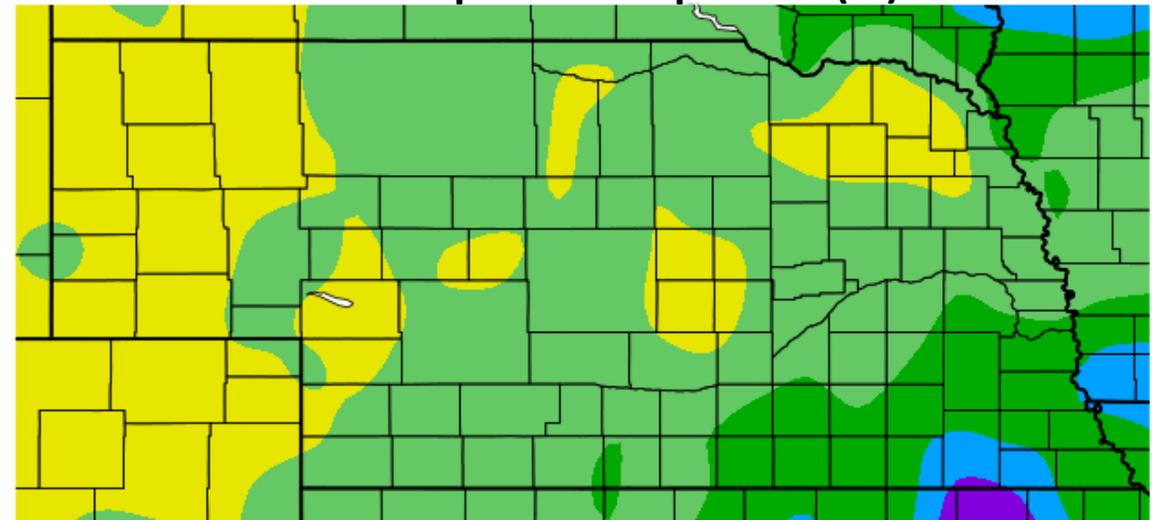
Fall recap

- Temperatures averaged 1°-2°F degrees below normal for SON. Strongest departures in the east and Kimball Co.
- A general wet pattern, driest for Panhandle and portions of central and northern Nebraska.
- Snow season began early for southeast Nebraska.

SON Temperature Departure (°F)



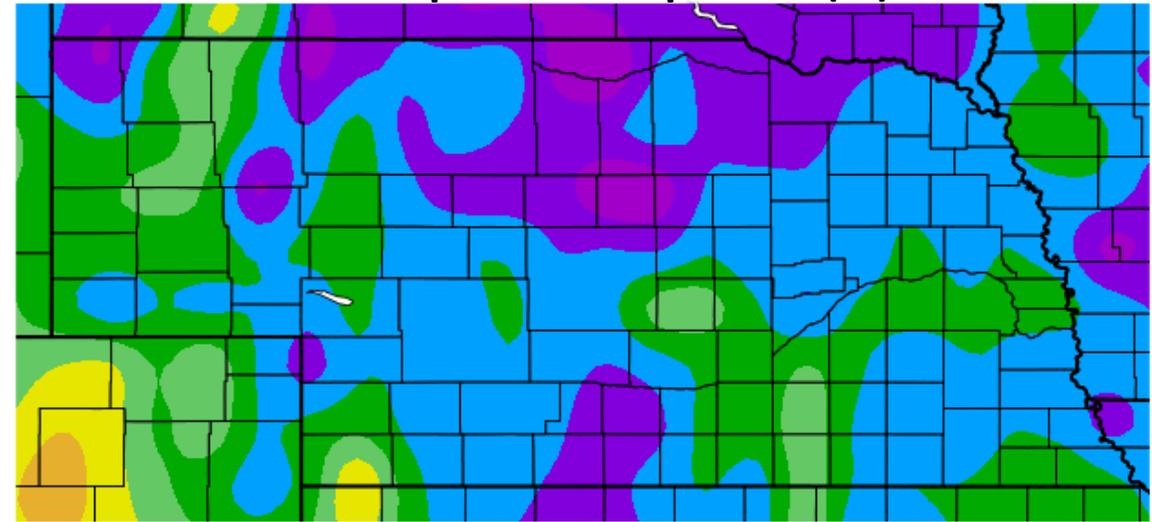
SON Precipitation Departure (in)



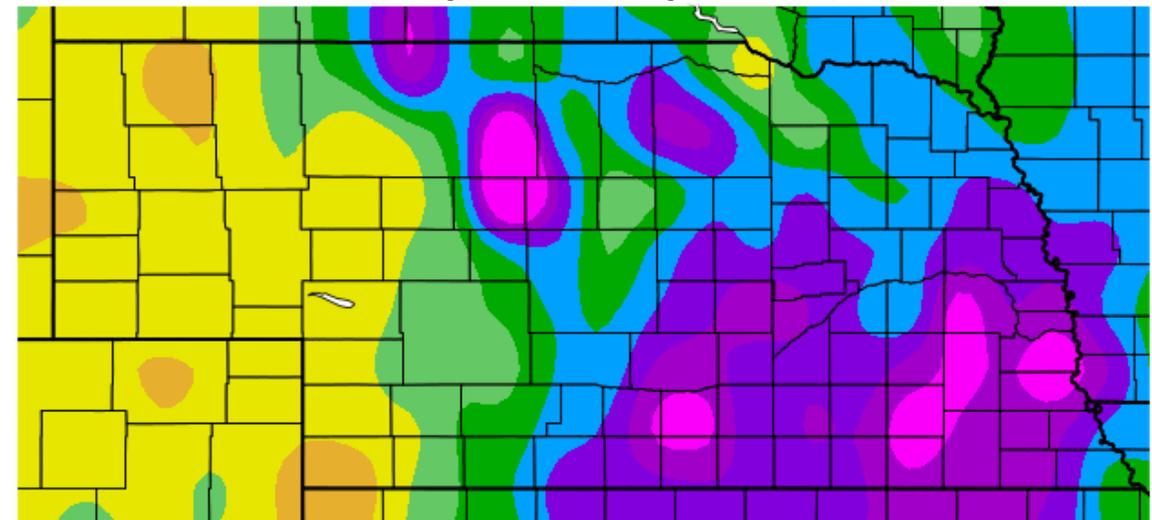
Winter recap

- Cool trend continued and strengthened from the fall. Temperatures averaged several degrees below normal for DJF.
- Snow was generally plentiful.
New snow records:
Lincoln 55.5"
Omaha 46.1"

DJF Temperature Departure (°F)

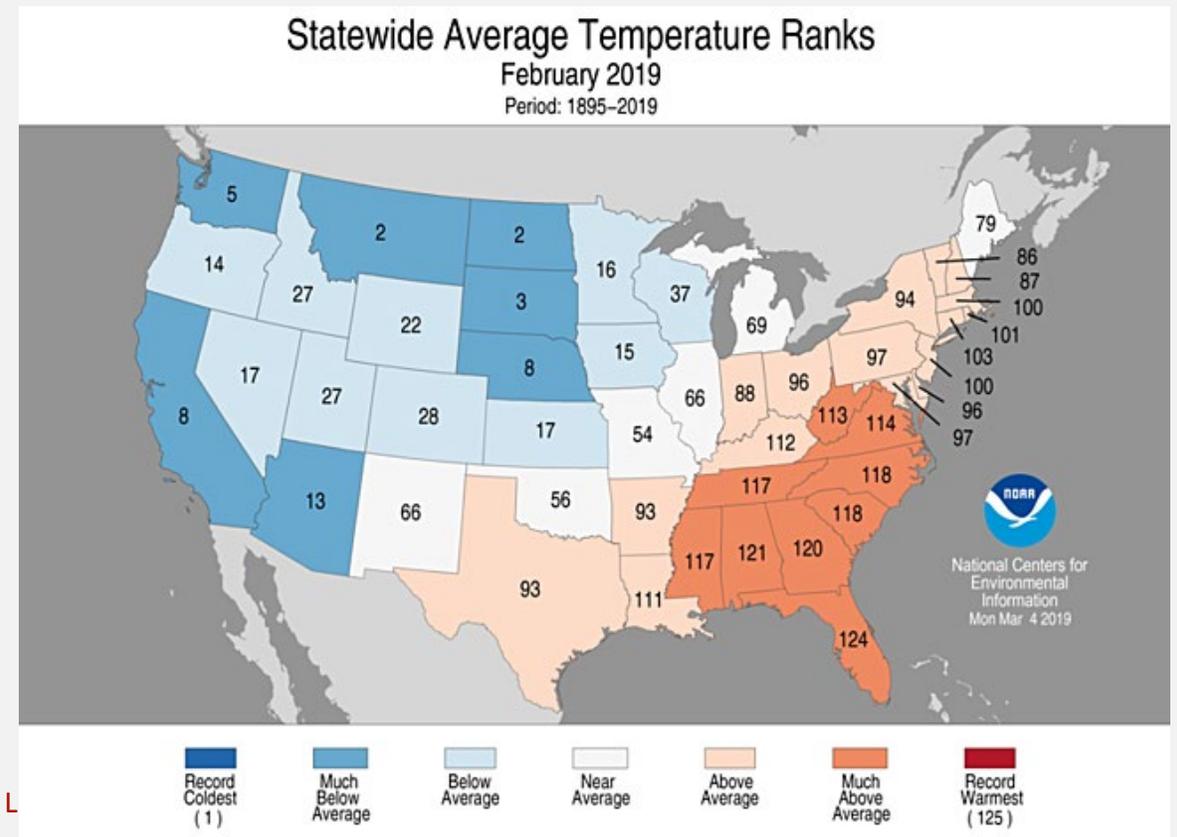
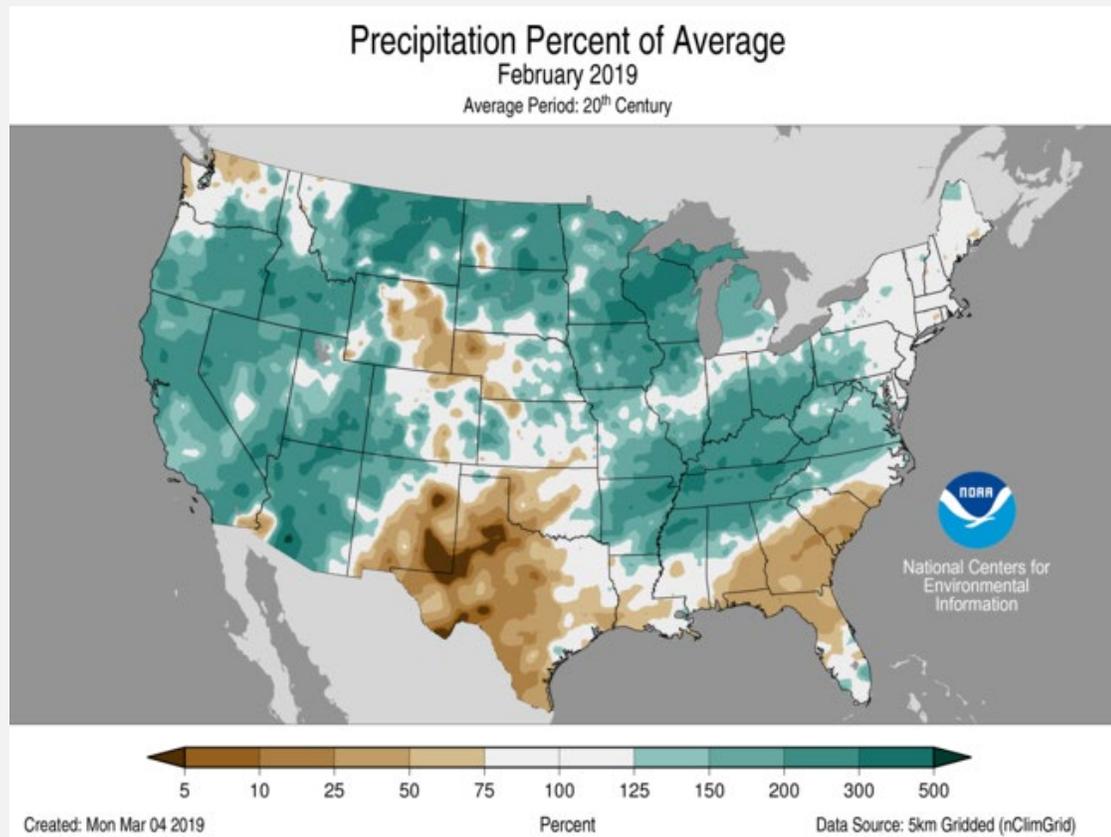


DJF Precipitation Departure (in)



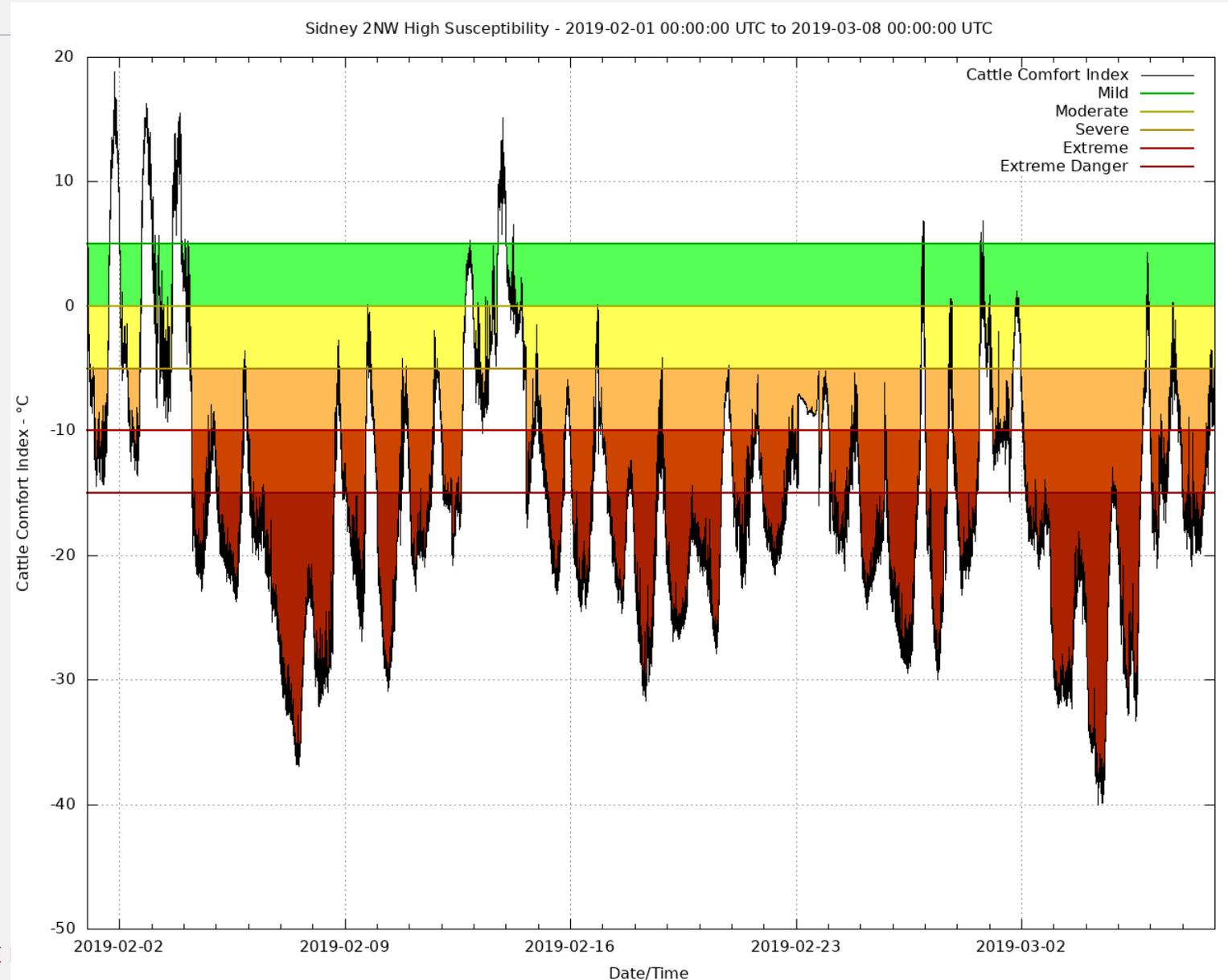
February

- Third coldest February in the U.S.
- Nebraska $\sim 11^\circ\text{F}$ below average, 8th coldest on record.
- General cool and wet pattern. Dry pocket in the Panhandle and southwest.



Winter cattle stress

- Reports from Extension of the need to identify potential for cattle stress.
- Information sent to USDA to supplement Livestock Indemnity Program criteria.

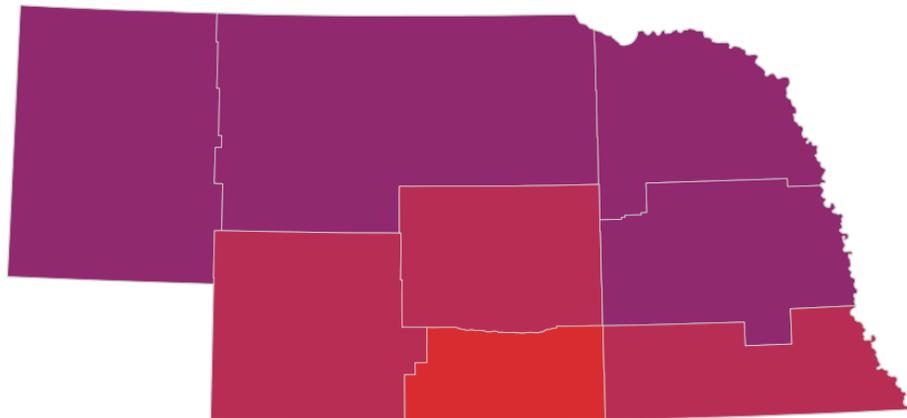


February trends

FEBRUARY AVERAGE TEMPERATURE (°F) NEBRASKA CLIMATE TRENDS

These maps show the climate trends over the long term and short term for the state's eight climate divisions based on industry-standard data from the National Centers for Environmental Information of the National Oceanic Atmospheric Administration. Long term trends use data collected between 1895 to 2016; short-term trends use data from 1987 to 2016.

Long-term rate of change
Per decade



Short-term rate of change
Per decade

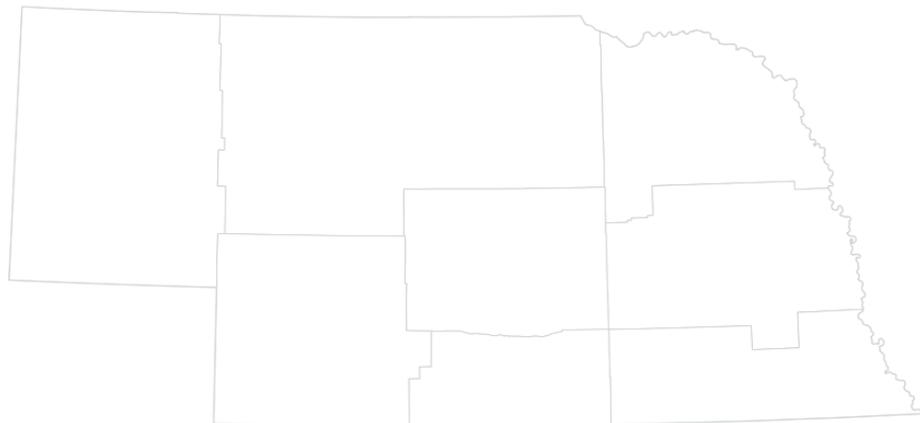


February trends

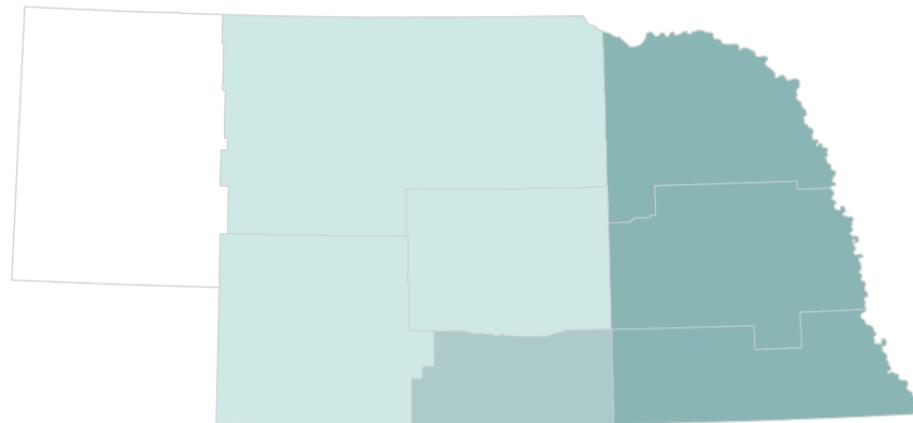
FEBRUARY PRECIPITATION (IN) NEBRASKA CLIMATE TRENDS

These maps show the climate trends over the long term and short term for the state's eight climate divisions based on industry-standard data from the National Centers for Environmental Information of the National Oceanic Atmospheric Administration. Long term trends use data collected between 1895 to 2016; short-term trends use data from 1987 to 2016.

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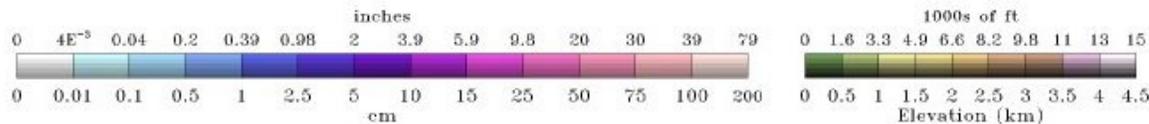
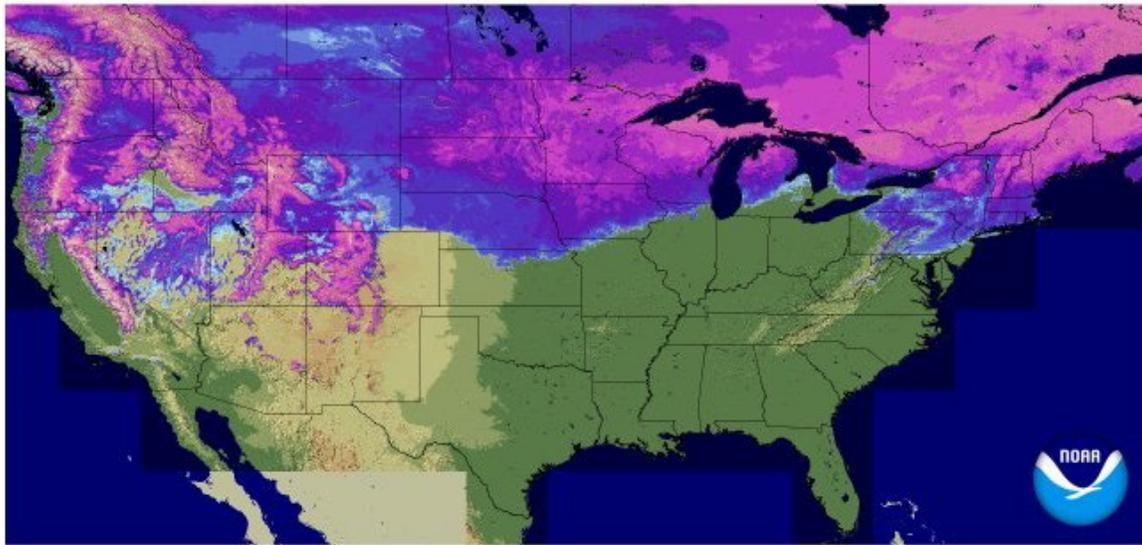
Setting the stage for March floods

Antecedent conditions were critical. . .

- Soils at or near saturation and frozen.
- Rivers and streams frozen.
- Several inches of water in the snowpack.

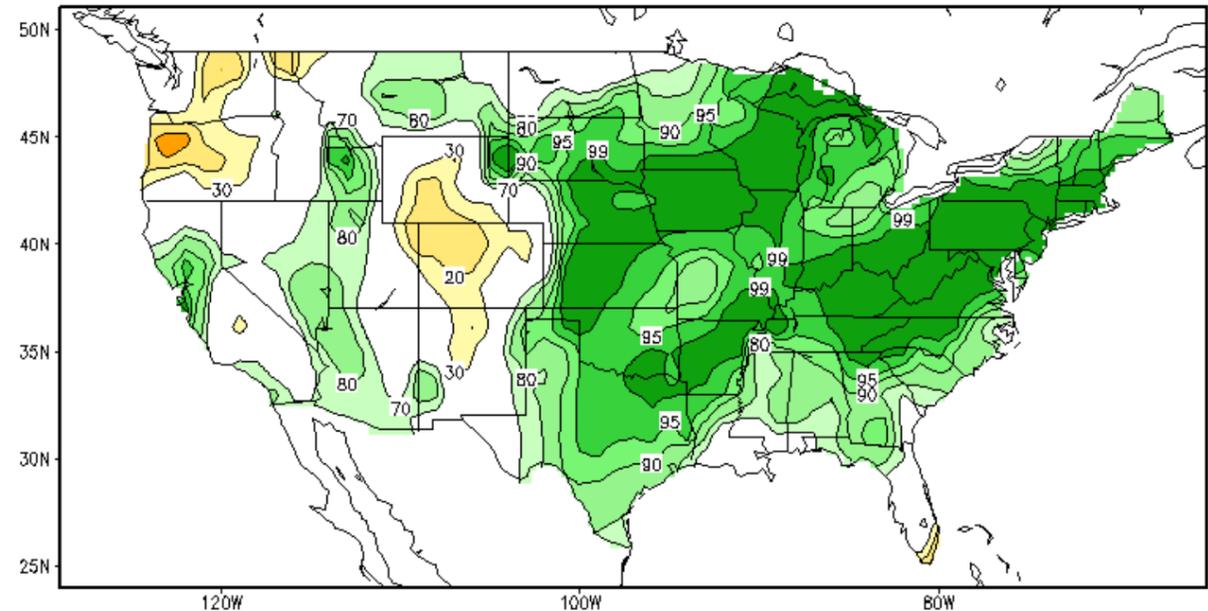
Snow Water Equivalent

2019-03-11 06 UTC



Calculated Soil Moisture Ranking Percentile

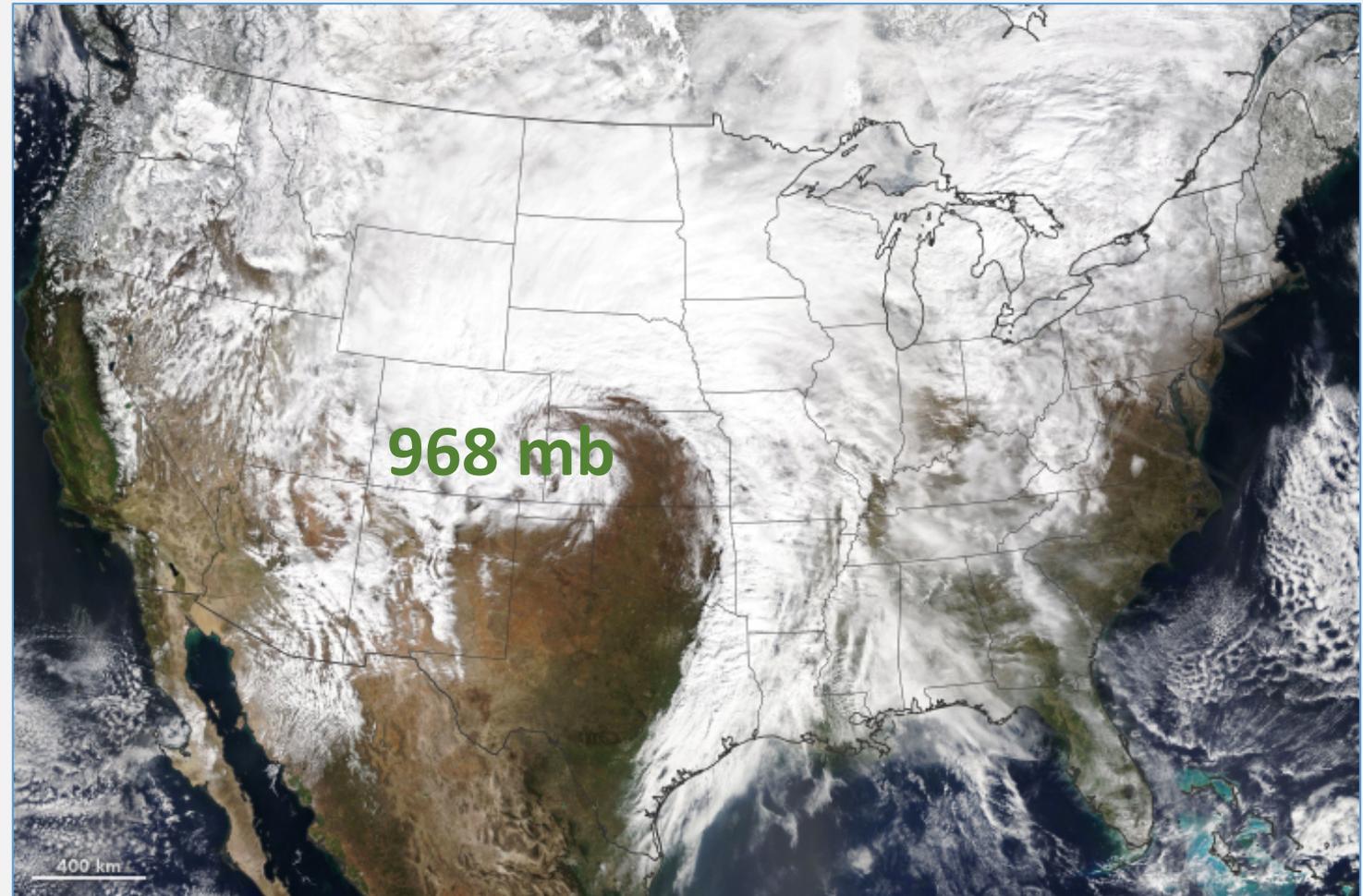
FEB 19, 2019



Along comes a late winter storm

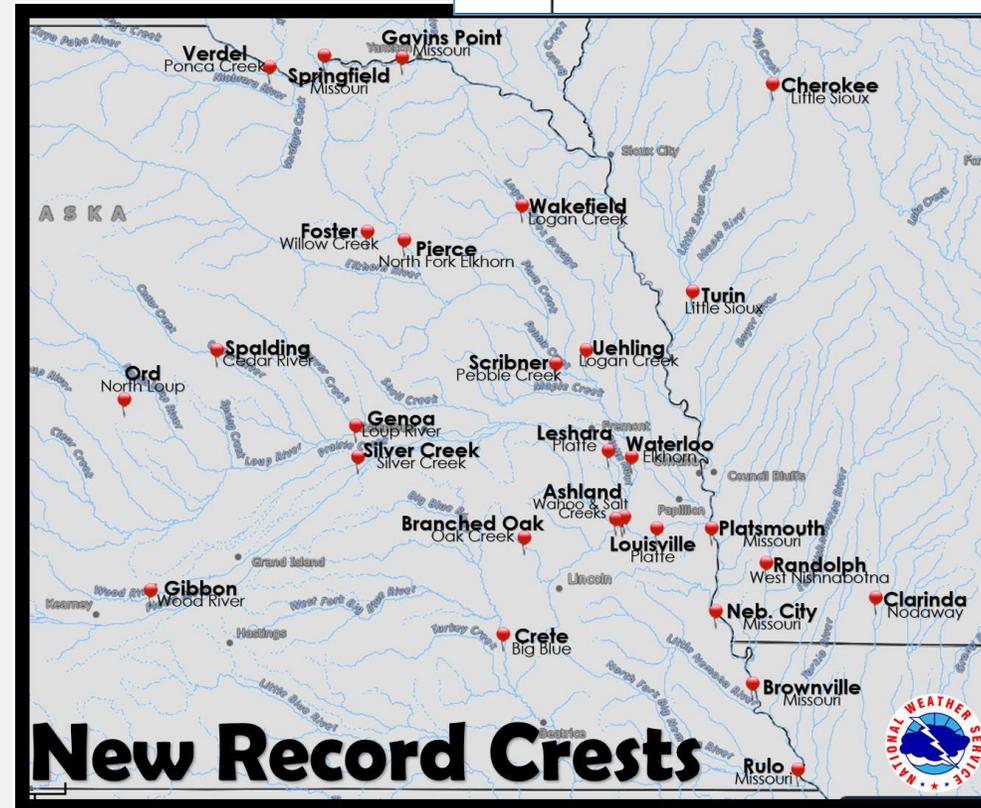
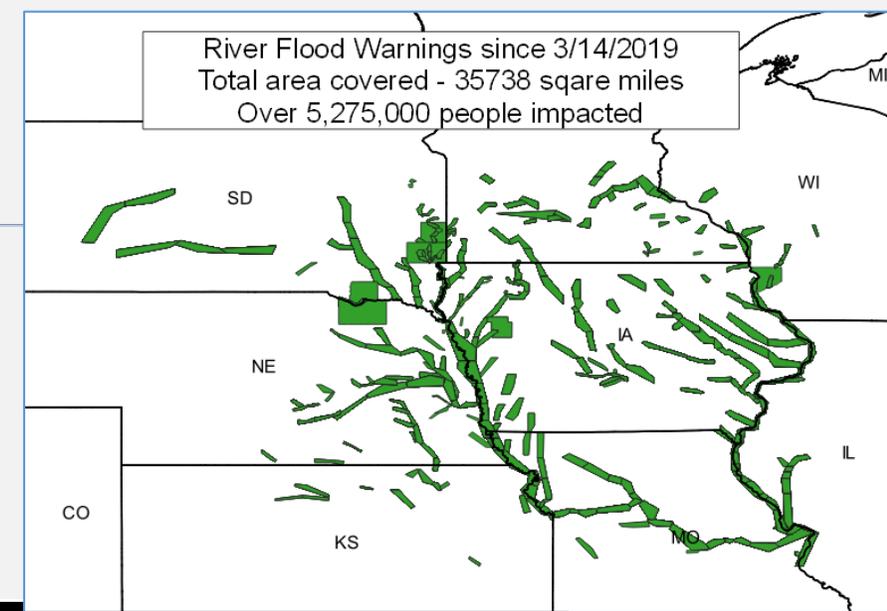
March 13, 2019

- Mid-latitude cyclone rapidly intensified.
- Consistently in model runs ~10 days in advance.
- Sustained high winds.
- Blizzard in the west, heavy rain in the east.



Extent of flooding

- Ice jams, snowmelt, heavy rain are contributors.
- Above flood stage for weeks.
- Record flooding at many locations.
- Damages estimated > \$2B in Nebraska.



Impacts are wide-ranging

- State of Emergency declaration.
- Failure of Spencer Dam due to ice damage.
- 4 deaths; cattle losses; towns temporarily cut off; damage to homes, businesses, roads and fields; loss of stored grain; water quality concerns.



Impacts are wide-ranging

N FLOOD RESOURCES

- Home
- Individuals & Families
- Homeowners
- Businesses and Communities
- Agriculture
- Spanish Resources



Nebraska - Flood Resources

Flooding in Nebraska

Whether it's a flash flood or a slow onset flood, excessive amounts of water can cause significant damage. Nebraska Extension is your trusted source for flood-related information. Our campus and county-based experts are ready to help you get the answers you need.

[Donations & Volunteering](#)

Staying Connected During Tough Times



Resources for Nebraska Farmers, Ranchers & Their Families

NEBRASKA STATE

Resources



Families & Individuals



Homeowners



Businesses & Communities



Agriculture



Seeking Community Hosts for Student Projects

The University of Nebraska is seeking community leaders to serve as hosts for a new summer program that will send students to assist in recovery efforts from the recent devastating floods.

[APPLY TODAY](#)

Disaster Recovery in Rural Communities Workshop

This course teaches community leaders and emergency managers in rural communities how to plan for and execute disaster recovery efforts. Upon implementation, this course will assist rural communities with expediting disaster recovery efforts and facilitating the long-term economic success of their communities.

[REGISTER TODAY](#)

Removing Sand Deposits

The Nebraska Department of Environmental Quality offers several options for sand removal, one of which requires US Army Corps approval.

[READ MORE](#)

Reduction of impacts?

- Broad-scale event that identified **weaknesses**
 - **Gaps in preparedness** and emergency operating plans
 - **Communication** of severity and taking action on the warnings

Nebraska Emergency Management, FEMA stakeholder meeting (Apr 24)



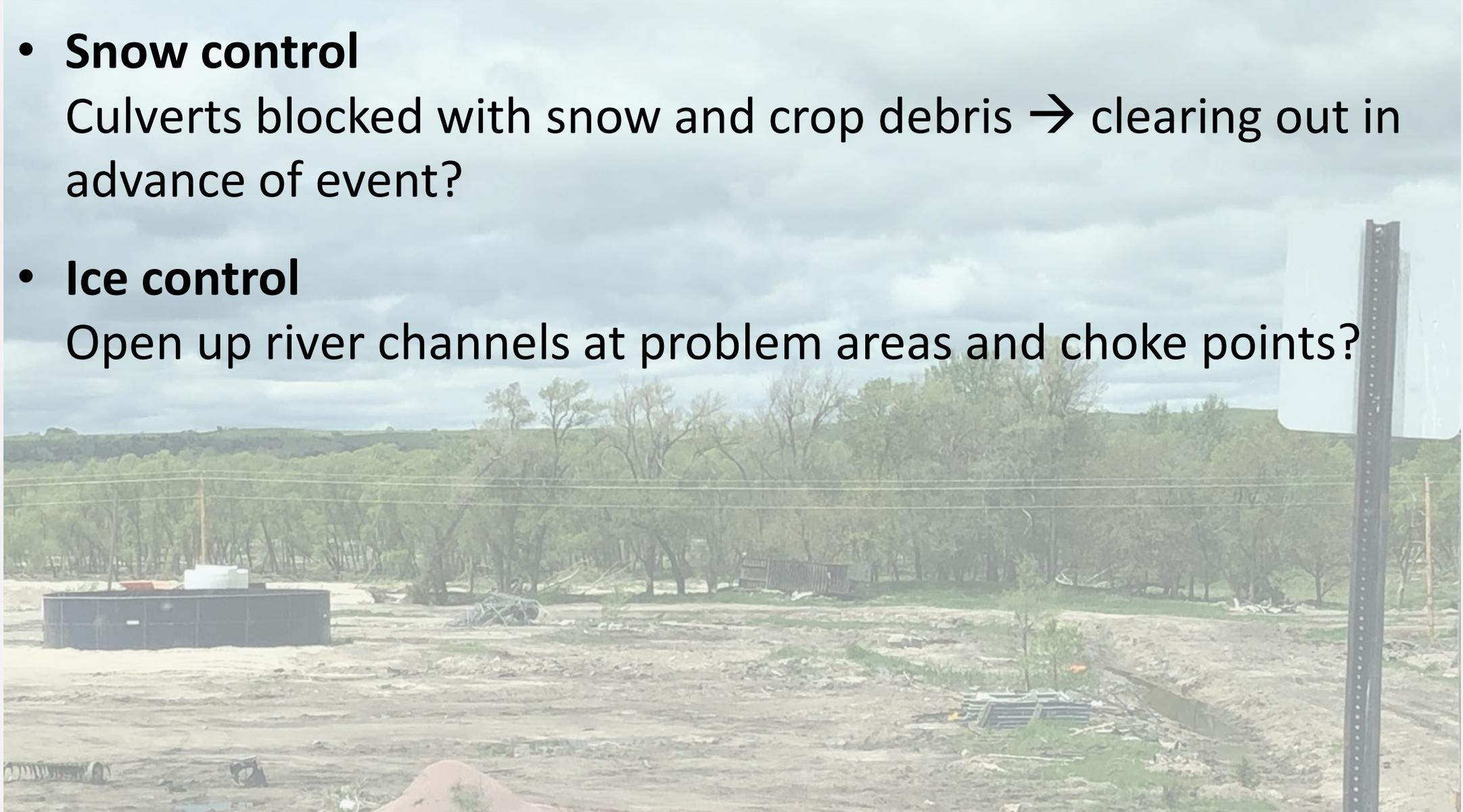
Reduction of impacts?

- **Snow control**

Culverts blocked with snow and crop debris → clearing out in advance of event?

- **Ice control**

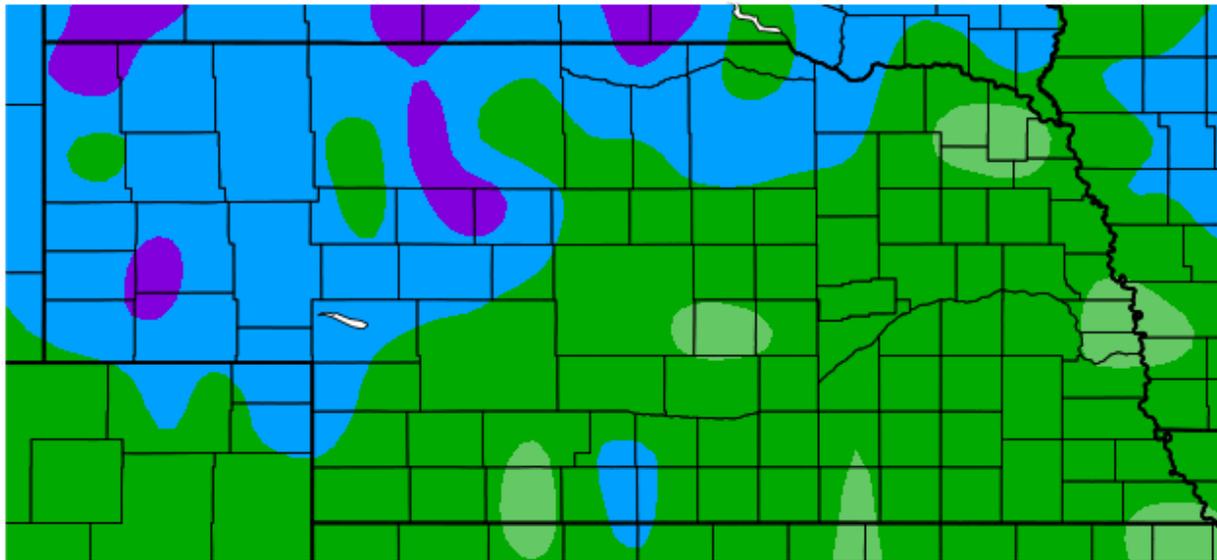
Open up river channels at problem areas and choke points?



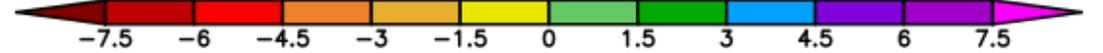
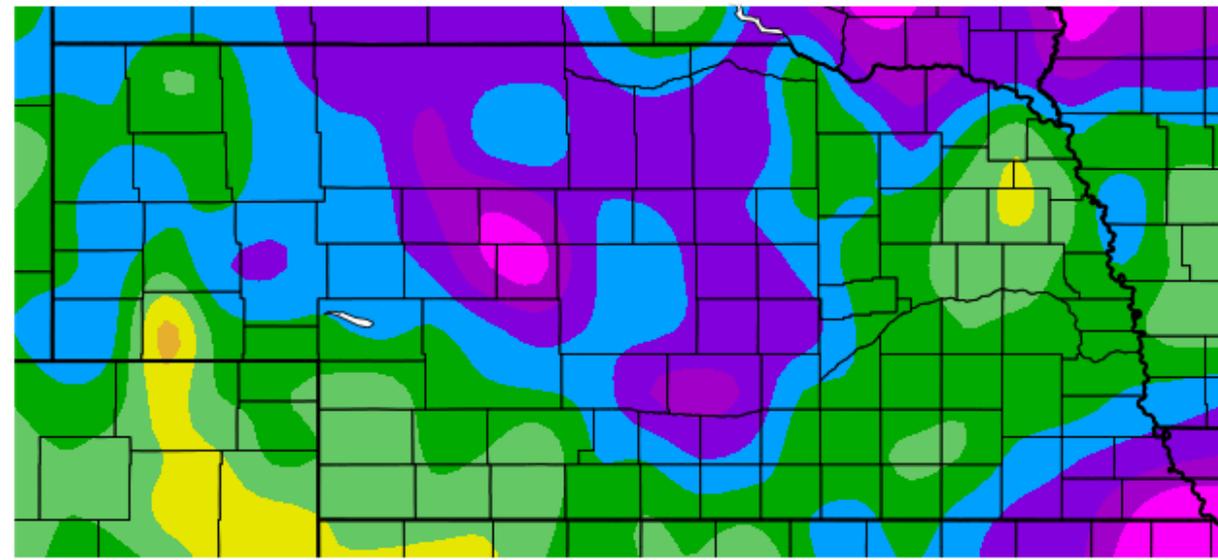
Spring recap

- March – cool, April – warm, May – cool.
- Cool and wet overall trend continues through spring months.
- Flooding and associated logistical problems, at/near saturated soils, above normal rainfall amounts and rainy days all leading to planting delays.
- Nebraska faring generally better than surrounding areas.

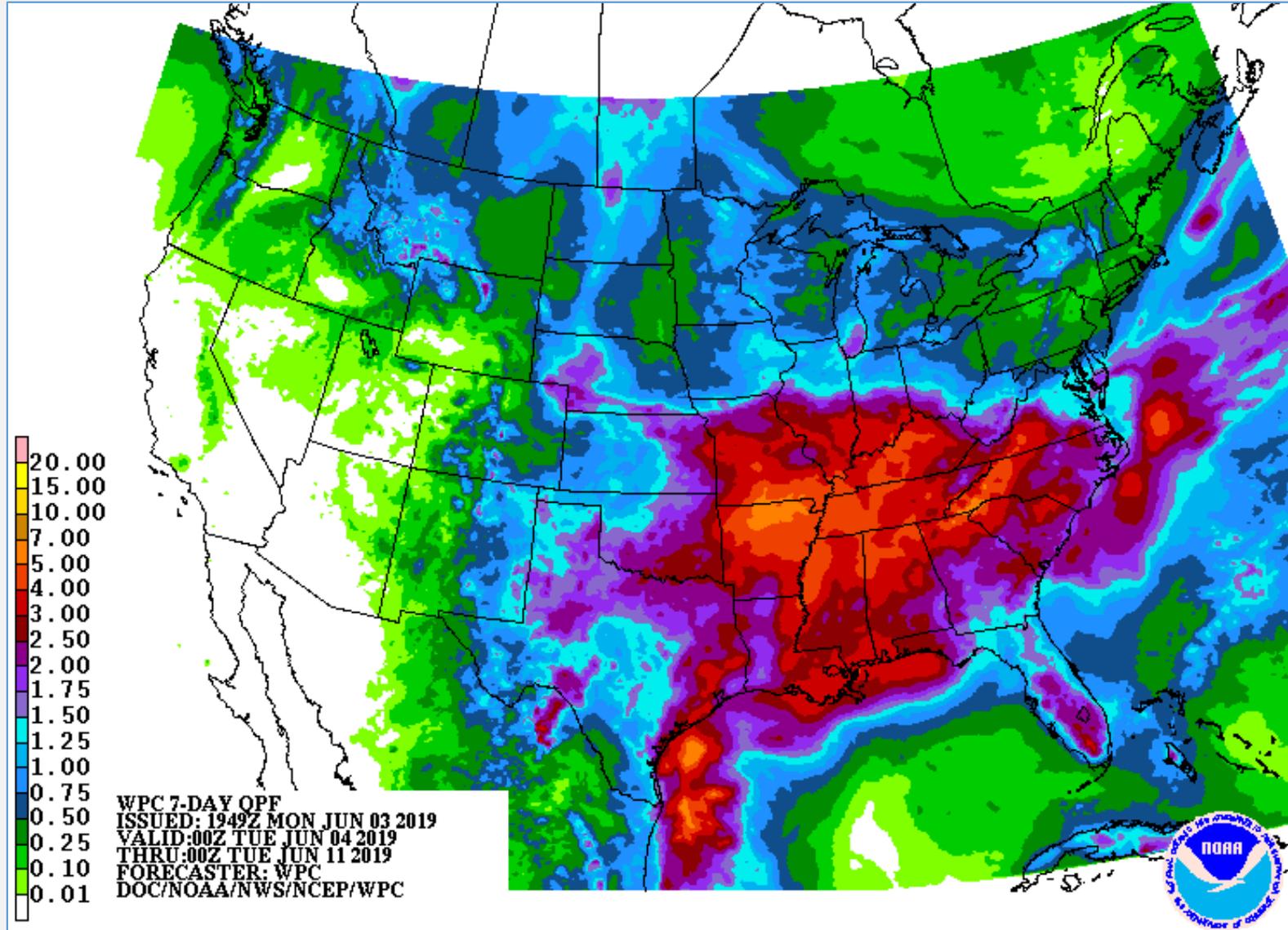
MAM Temperature Departure (°F)



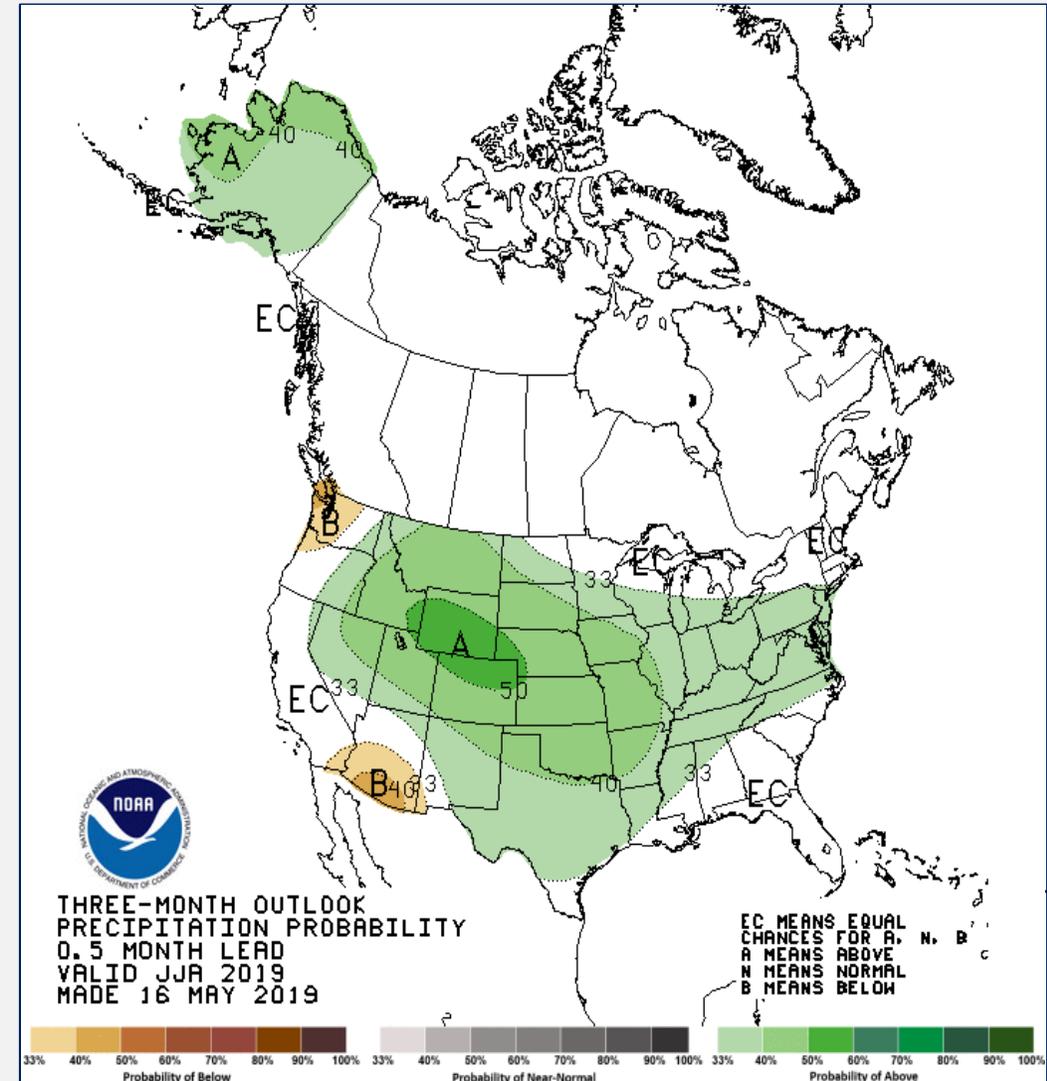
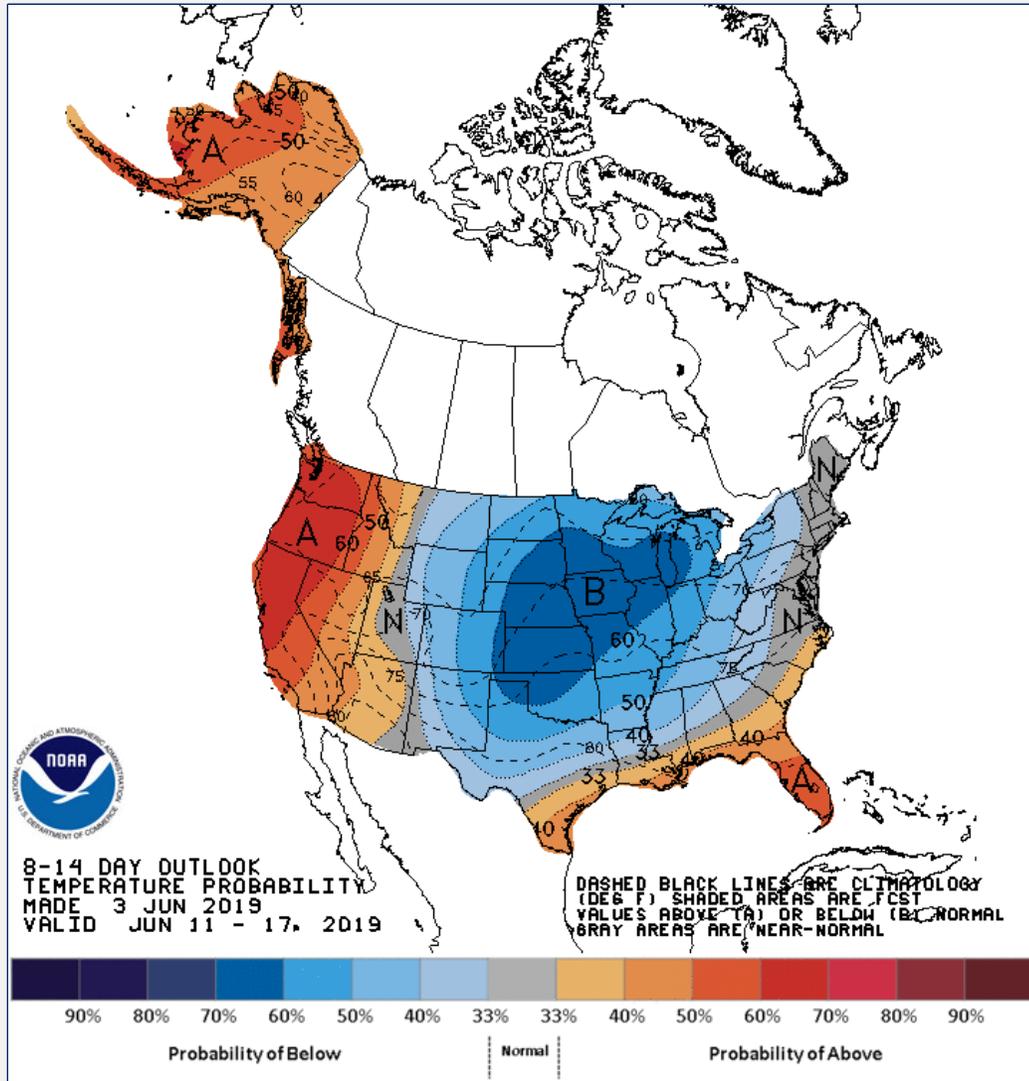
MAM Precipitation Departure (in)



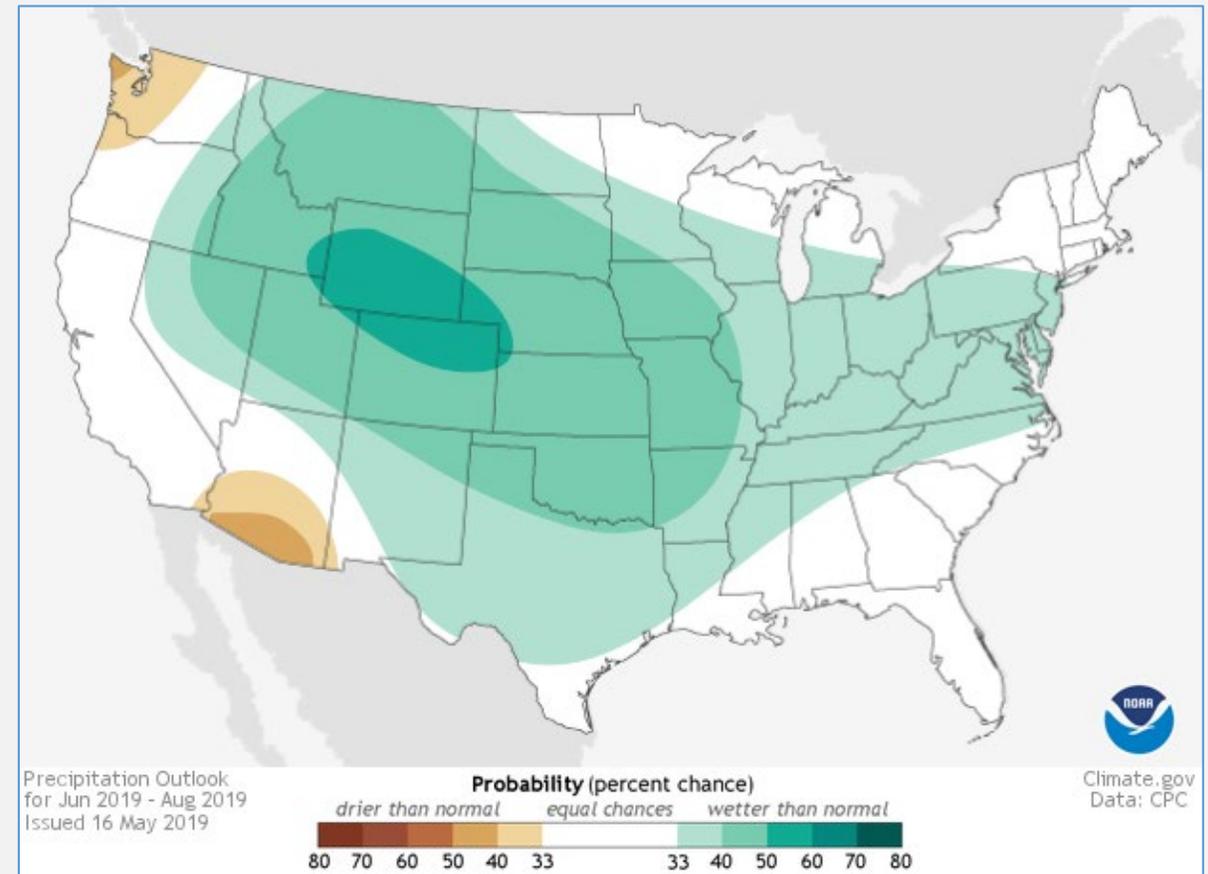
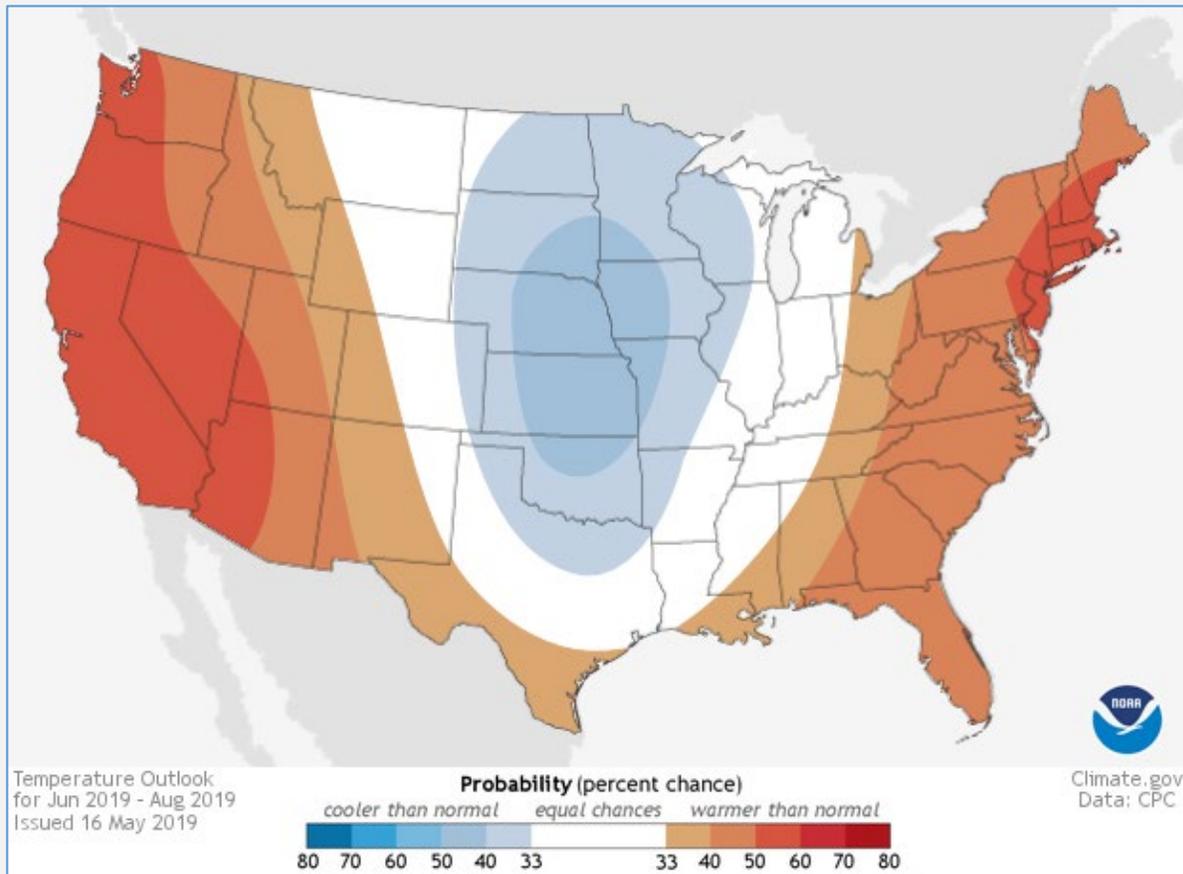
Precipitation forecast: Jun 4 - 11



Outlook: Jun 11 - 17



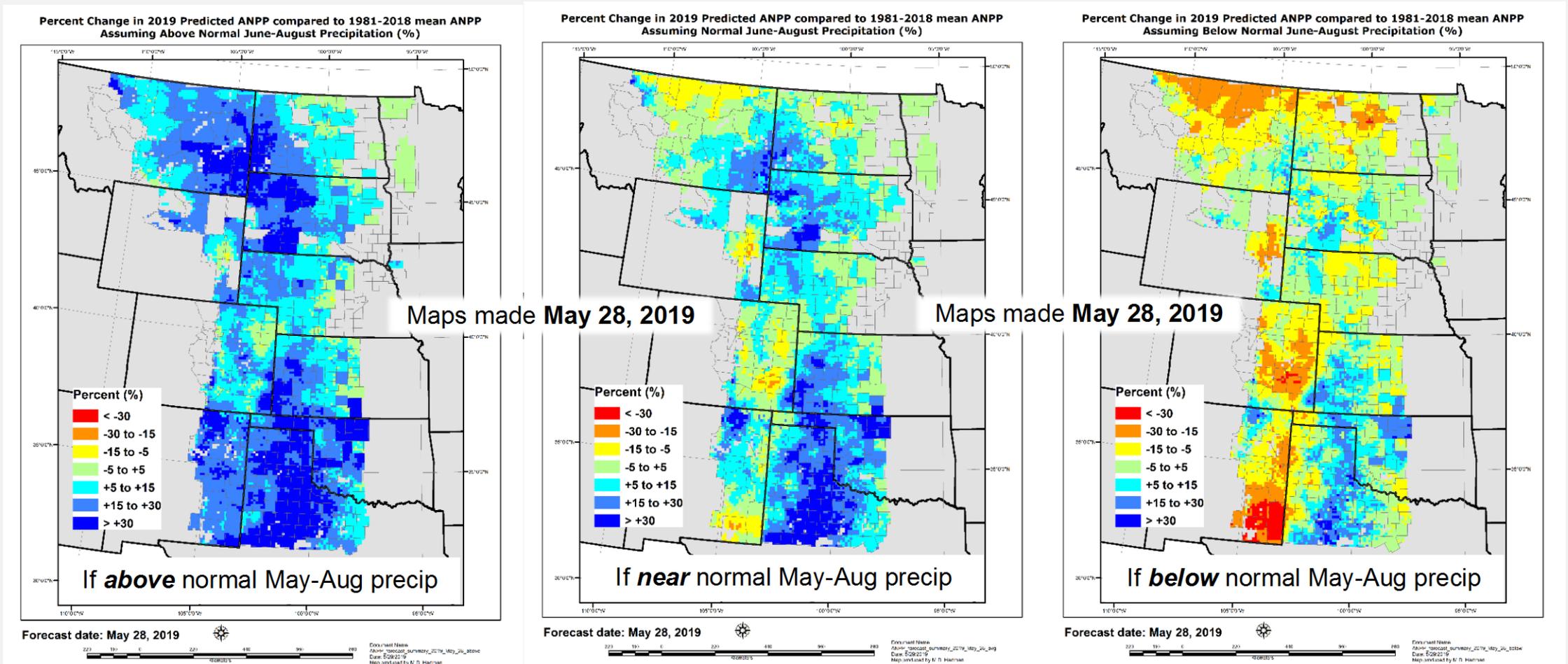
Outlook: Jun-Jul-Aug



Grassland Production

% Change in Grassland Production (lbs/ac) this Summer, Compared to an Area's 38-yr Average

For the 3 maps (scenarios) below: "If precipitation between now & Aug 31st is **above** (left map), **near** (middle), or **below** (right) normal, grassland production in your grid-cell will be ____% more or less than its 38-year average."



Potential impacts going forward

- Of the corn emerged (~70%), most 2-4 leaf stage. Color improving but still yellow in saturated areas.
- Nitrogen losses and weed control issues.

Scenarios

> Cold June

Need a warm September and no early freeze to get a mature crop.

> Wet June and summer

1993 conditions possible with saturated soils and low oxygen.

> Hot and dry

Flash drought increases risk due to poor root structure.



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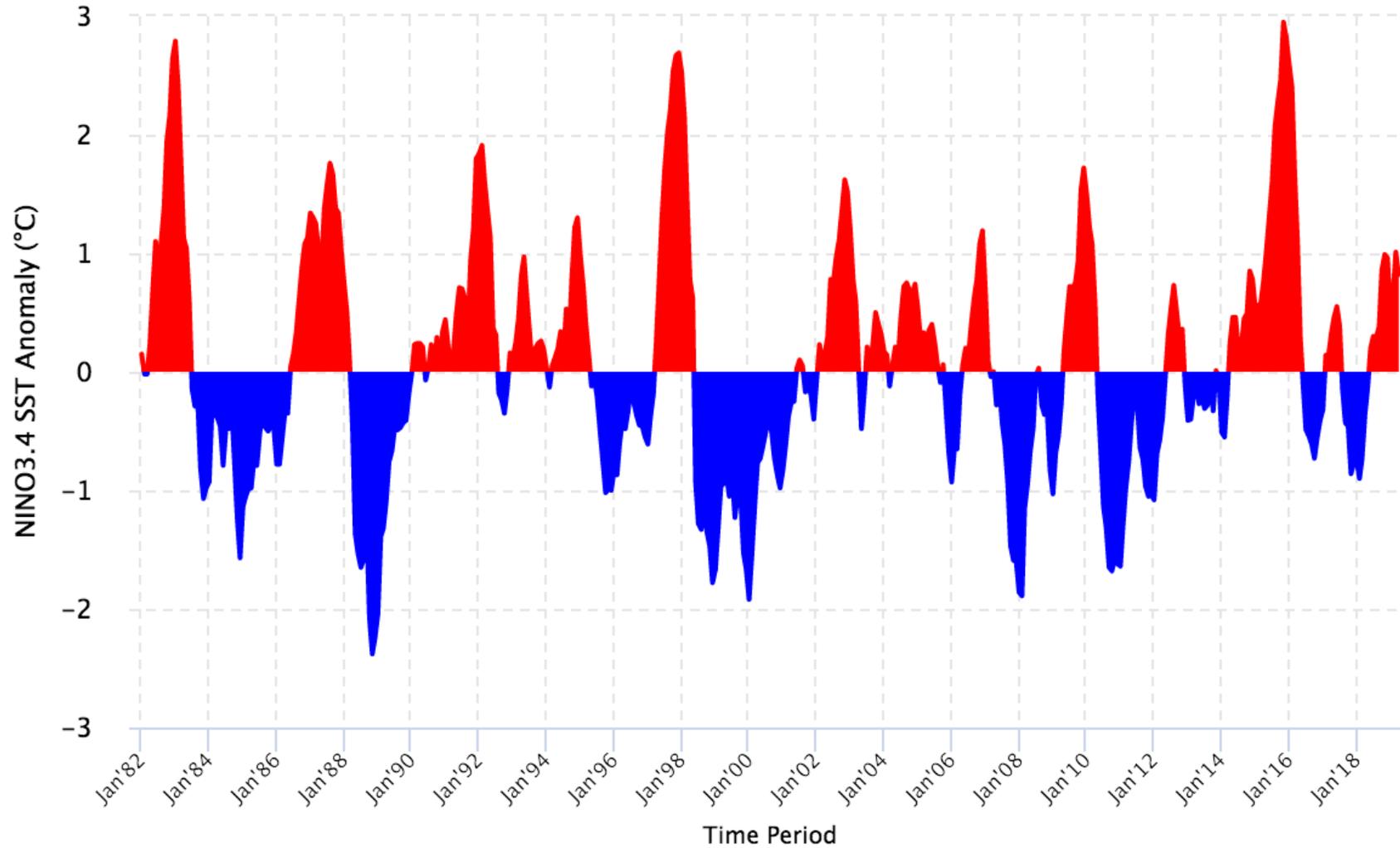
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ENSO

Historical Nino 3.4 Sea Surface Temperature Anomaly



ENSO

